

IN REPLY REFER TO:

# United States Department of the Interior

FISH AND WILDLIFE SERVICE  
Division of Law Enforcement  
National Fish and Wildlife Forensics Laboratory  
1490 East Main Street  
Ashland, Oregon 97520

## Partial bird identifications osteological elements

### Objective

This protocol describes the process by which the forensic ornithologist makes determinations to the species **level** (or **higher taxonomic level**) of **osteological** bird evidence (skeletal **structures**) utilizing scientifically determined morphological characteristics at ordinal, familial, generic and specific levels. This addresses the **twenty-six** orders (approximately 8700 species) of extant **avifauna**.

Sex, age, and **number** of individuals are also determined when possible.

### Equipment and supplies

clean, dry, well-lit work area	sink (hot and cold water)
compressed air	steaming <b>water</b> source, detergent
gloves, forceps, probes, scissors, scalpels	calipers, ruler
bags, lab&/tags, evidence tape	<b>paper, pens</b>
bird <b>osteological</b> standards collection	<b>literature</b> (field guides, etc.)

### Evidence handling and preparation

NFWFL evidence handling procedures are to be adhered to at all times. **See** NFWFL procedures manual.

Notes are taken by the examiner and maintained with the tile.

**Osteological** material must be clean and dry (free of tissue, dust, dirt, etc.) OR pertinent species determining characteristics available, as determined by the examiner. Tissue can be removed by dissection or utilizing a dermestid beetle colony. Dii can be removed using hot water; compressed air or damp cloth can be used to remove surface dust. Condition of skeletal material should be **noted** (including **completion** of skeleton and/or elements, **cleanliness**, etc.).

3/1/95

**NFWFL Bird Unit protocols**  
**Avian osteological identifications (cont'd)**

**Analytical procedures**

Osteological identifications require significant experience in **avian** comparative anatomy. The experience and expertise of the examiner will determine the point at which comparisons are made, and the extent of utilization of the standards collection, in the identification process.

step 1. **Determine** element typus (bones) presented as evidence (e.g., skull, humerus, **carpometacarpus**, pelvis, etc.). (see *Nomina anatomica avium*, Baumel, 1979; *Manual of ornithology*, Proctor and Lynch, 1993; *Avian anatomy: Integument*, Lucas and Stettenheim, 1972). Broken elements must be recognized as incomplete, and identifications pursued with this **knowledge**.

step 2. **Determine** age of individual at **time** of death (adult, **immature**, chick, etc.) based on development of **epiphyses** and diaphyses, presence of cartilaginous **structures** and fusion of tabular bone.

**step 3.** Determine order and family utilizing visual, macroscopic examination of general morphology of the elements at hand, and the presence or absence of familial **features** (**palatal** configuration, **manubrial** morphology, proportion of **preacetabular ischium** to ilium, etc.). Depending on **nature** and condition of evidence items, identification to higher taxonomic level is possible based on knowledge of **natural** history, feeding habits, locomotion, and relative size of body parts.

step 4. **Determine** genus and/or species utilizing **specific morphology** (e.g., **coracoid/coracoidal sulcus** fit, angle(s) of deltoid crest, extension of **cnemial** process, etc.), unique distinguishing characteristics of similar species (perforated mesethmoidal, syringeal bullae morphology, **olecranon** shape, etc.) and size of bird. If necessary, note **measurements** to aid in specific **determination/confirmation**. Measurements are standardized in *Measurements of birds* (Baldwin et al., Sci. Publ. Cleveland Mus. Nat. Hist. 2, 1931).

step 5. **Confirm** species identification **by** comparison of evidence item with scientific specimens (**disarticulated** skeletons, etc.) **and/or** reference to the literature (field guides, photographic guides, taxonomic keys, **specifically** *Osteology for the archaeologist: North American birds*, Olsen, 1979; *Avian osteology*, Gilbert et al., 1985).

step 6. Determine **number** of individuals based on replication of **like** elements

Physical characteristics of note:

**size**

general morphology

relative body part size (especially **tibiotarsus** and tarsus length to overall length; wing length to length of leg; **beak length** to length of leg)

beak morphology (**raptorial**, seedeater, filter feeder, etc.; size, etc.)

foot morphology (**scutellation**; number of toes; toe configuration; talon size, shape, proportion, etc.)

8/4/95

**NFWFL Bird Unit protocols**  
**Avian osteological identifications (cont'd)**

**Reporting of analytical results**

**Standard NFWFL report format is used.**

The examiner reports common and scientific **name** if **specific determination** is made. Source of common **name** is *Field guide to the birds of North America* (National Geographic Society, Washington, DC, 1991) or *A coded workbook of birds of the world* (E.P. Edwards, Sweet Briar, VA, 1982, 1986).

Report may include age (adult, **subadult**, etc.), **sex, number** of individuals, and condition of material (parts missing etc.), as appropriate..

Preparation **notes** are included in report, as appropriate


**When** condition of evidence, lack of comparative material, or lack of appropriate literature references precludes **specific confirmation**, report is to lowest **taxonomic** level possible. Note should be made in the report to reflect this level of identification.


BA/AS

Morphology Section, National Fish and Wildlife Forensic Lab

Protocol for:

**Partial Bird Identifications**  
(osteological elements)

 Beth Ann Sabo Bird Unit Coordinator	<u>9 May 1995</u> Date Approved
---	------------------------------------

 Stephen D. Busack Chief, Morphology Section	<u>9 MAY 1995</u> Date Approved
---	------------------------------------

 Kenneth W. Goddard, Director	<u>26 June 1995</u> Date Approved
---	--------------------------------------